

STAT

Ref: 552-0D-207

24 August 1964


STAT



Projects 552-&-552A

Progress Report, July 1964

Gentlemen,

Enclosed are three (3) copies each of  Progress Report on Projects 552 and 552A for the period, July 1964, and Attachment I "Review of Meeting - July 7, 1964".

STAT

Very truly yours,



STAT

President

ARB/de

Encl: 3 P.R. - 5 pp.
3 Att. - 3 pp.

Declass Review by
NIMA/DOD

PROGRESS REPORT

For

VERSATILE, HIGH PRECISION STEREO
POINT TRANSFER DEVICE

Period Covered: July 1964
Dated: 20 August 1964
Job No.: #552 and #552A
Document No.: OD-205

#552 - OD-205

PROGRESS REPORT
For
VERSATILE, HIGH PRECISION STEREO
POINT TRANSFER DEVICE

Work in this reporting period has been to assemble and debug mechanical and electrical subassemblies on a unit preceding the Point Transfer Device.

OBJECTIVE ASSEMBLY

Debugging is being done on several subassemblies here. Low power field lens appears to work well optically and mechanically. Turret indexing is prompt, about two seconds per index, and precise. Zoom magnifier has received much attention to refine its optical and mechanical adjustments. Preliminary tests of objective assembly optical performance are encouraging. However, the fiber cable will have to do an exceedingly good job to meet system requirements.

EYEPIECE ASSEMBLY

Assembly is complete and appears to be "bug" free. However, its evaluation will be started in August when system assembly is completed. Its optical performance is good, being about three times fiber cables resolution. Distortions and chromatic aberrations have good control.

We have had some trouble with several fiber cables in their image rotation and limit mechanism. It is hoped that this problem can be resolved in August so that completion of future systems is not delayed. A visit to plant is planned to expedite solution here.

STAT

#552 - OD-205

SUPERSTRUCTURE AND EYEPiece SUPPORT

Manufacture is nearly complete on components of support linkage and adaptation to radial saw arm. Improvements to eyepiece angular and vertical adjustments have been investigated, but have yet to be resolved with customer. A gear ratio change, for angular adjustment and a motorized vertical adjustment, appears to be the most practical solutions here.

BASE FRAME AND DRIVE MOTORS

"Slo-Syn" motors and two speed gear boxes have been tested in assembly and examined for problems. Vibration may be of concern, but can be evaluated only when optics are installed. Motor appears to have resonance at several points in the speed range, causing a noticeable vibration in carriages. Speed-up ratio between motors and screws was decreased to lower maximum speed of screws to nearly 1 in/sec.

Two (2) speed gear boxes required small redesign to improve their rigidity and load capacity. Because the discrete motion of stepping motors imparts significant instantaneous loads and vibrations, great attention is being paid to screw drive system.

Electronics for stepping motor frequency determining circuits have been designed and evaluated, although linearity between stepping frequency and optical magnification will be 20% through a 40:1 frequency range. Most of the error is at the low frequency end. The problem has been to purchase, or develop, a voltage controlled oscillator for the system with linearity less than 5% between voltage and frequency and a wide (300:1) low frequency range. Although improvements of linearity will be looked for, a circuit is being built for evaluation. Future changes are implemented by plug-in oscillator packaging. In addition, as a possible advantage for fine positioning and an aid in linearity

#552 - OD-205

improvement at low speeds, the screw drive will have two (2) motor speed ranges, as well as the two (2) speed gear box. If the wide range oscillator is installed later, this low motor speed range can be assigned a "jogging" use.

VACUUM PLATEN AND MANIFOLDS

Much difficulty has been experienced in placing molded rubber seals for manufacture. Delivery of tooling and parts manufacturing quoted us have made it necessary for molds to be made here. With this motion, parts may be ready for installation in late August.

Microgrooves have received attention in experimenting with other polishing techniques than that used by vendor. From 20x and higher magnification there is much improvement, although microgrooves are not truly invisible at lower magnifications. Customer will be shown these at August meeting.

To realize these improved microgrooves, a rather lengthy manufacturing process is required, and will significantly raise parts cost and may greatly increase pull down time. Therefore, we are proceeding to obtain one (1) set of platens without microgrooves for experimentation with flat holddown surfaces. With the improved seals in the manifolds, a lower pressure difference across film may help reduce chance of isolated air pockets under film upon pull down. Conclusions should be seen in late August.

HIGH INTENSITY LIGHT SOURCE

Parts nearly completely fabricated and will be in assembly in August.

#552 - OD-205

ELECTRICAL SCHEMATICS, WIRING DIAGRAMS

Because of improvements in voltage controlled oscillator and additional motor speed range, electrical schematics and wiring diagrams required extensive changes and additions.

In addition to the above, electromechanical counters for coarse measurement required design and fabrication of drive circuitry to make their operation reliable. A pair of transistorized monostable multivibrators and power amplifiers are required for each counter and is mounted on an easily replaceable and serviceable circuit boards.

JOY STICK

Assembly of preceding unit is complete and awaiting special potentiometers in joy stick mechanism. Coupling linkage appears to work well with less lash than estimated between master and slave control elements.

Design of electrical harness brackets and placements needed to finish assembly will be completed in August.

POINT MARKING

Laser system is being repaired at vendor's plant, and will receive checkout in August. Perhaps before end of August, point marking system can be set up for specimen evaluation.

#552 - OD-205

Work to be Completed

1. Complete experimentation and development work in film holddown system and point marking.
2. Follow up and assist manufacturing and purchasing phases.
3. Complete all possible subassemblies.
4. Complete schematics and wiring diagrams.
5. Checkout completed subassemblies where possible.

ATTACHMENT I to #552 OD-205

REVIEW OF MEETING - JULY 7, 1964

LASERS

Stated failure of crystals to perform to output required that evaluation is still delayed.

VACUUM PULL DOWN PLATES

Stated vendor cannot supply depth desired for desirable pull down time and provide desirable visibility. Shallow grooves may improve visibility, but will require longer holddown time. Use of 9 1/2 inch wide film highly probable, therefore, pull down time could be 30 to 50 seconds. What vacuum technique seen or used by customer? [] uses high manifolds - no other analgous schemes. What solution? Possibly using imperfect microgrooves on first unit and attempting development.

Groove structure was discussed. Disadvantage seen was grooves steep wall.

Pull down time is only variable, customer may allow as seen at this time.

Eyepiece elevation - will see #571 for evaluation.

#552 READOUT

Have just received contract, and as yet have done nothing.

[REDACTED]

ATTACHMENT I to #552 OD-205

POINT MARK FLAGGING

Because laser is out of commission, evaluation of parenthesis is delayed.

Customer wants flagging mark as a separate variable, as required in design objectives.

Point, flagging or numbers (index) are independent. Could want no point mark, regardless of its size.

Circular flag is OK, but has to be independent.

Customer was not aware that 8 x lens had to be indexed for marking operation.

#552A ENCODERS

Navy would want a smaller least count if it cost no more.

STAT [REDACTED] to write letter to state new least count value of least count of no concern.

The question is what problems 1,000 count encoder by Data Tech might introduce. [REDACTED] will search out the problems.

STAT

Source for encoder is another problem so that reliable equipment is purchased. Dollars are limitation here.

STAT [REDACTED] to send Preliminary Installation Engineering form.

ATTACHMENT I to #552 OD-205

REVIEW OF JOY STICK BREADBOARD

Breadboard seen was a desirable starting point. Axial definition, or "channeling", found desirable. Too much "dead space" on #571. Would take 1/2 of play as seen here.

CONTROL PANEL

Add switches for laser reticle controls independent flagging and point mark.

Customer would like control panel to be on same plane of writing top within possibly 1/2 inch.

COMMENTS ON MICROGROOVES AS SEEN ON #571

Definitely not acceptable. Customer was to look at sample at his facility.

EYEPiece ADJUSTMENTS

Still rough - motion cannot reach from chair, acceptable fix could reduce vibrations or force required.

Cannot look and adjust height while seated.

Hard to turn angular adjustment - gear ratio should be much greater to reduce forces and vibrations.